4-Bit Electronic Clock DIY Kit

1. Introduction

YSZ-4 four electronic clock, it takes AT89C2051 as its core, a total of 16 electronic components to come true the two channels of the alarm clock, (8:00-20:00) on time alarm ,accurate adjustment , and other functions.

2. Parameter

NO.	Parameter	Value
1	Operating voltage	DC 5V
2	PCB board material	RF-4
3	Size	52mm*42mm

3. Principle

The whole system by MCU minimum system, key input circuit, display circuit, buzzer circuit and power supply parts.

1>. MCU minimum system: including the U1 (AT89C2051), C1, R1 for power on reset circuit .Clock circuit is composed of C2， C3 and Y1.

2>. The pressed key input circuit：composed of S1, S2, short press the button once a loud buzzer rang, long press the button once two loud buzzer rang.

3>. The display circuit：4bits common cathode and on PR1 Resisters Packs .

4>. Buzzer circuit：composed of Q1, R2 and LS1, short press the button once a loud buzzer rang, long press the button once two loud buzzer rang.

5>. J1 is 5v power supply input terminal, C4 filtering.

4. Operation instruction

It will display 12:59 when Power-on，while is normal interface("hours:minutes"). The both channels of alarm clock are opened.At the same time,the first alarm clock has been set at 13:01.the second alarm clock has been set at 13:02.

After power on ,short press S2.The display of digital tube will switch between "hours:minutes" and "minutes:seconds";Long press S1 to enter the system Settings menu. there are A, B, C, D, E, F, G, H, I submenu. Short press S1 sub-menu plus increase by degrees。finally back to the normal interface

A Sub menu : Correction for hours

Display data will add 1 after press S2.after adjusted the A Submenu,then short press S2 to save the adjusted results and quit A submenu,enter B sbumenu

B Sub menu : Correction for minutes

Display data will add 1 after press S2.after adjusted the B Submenu,then short press S2 to save the adjusted results and quit B submenu,enter C sbumenu

C Sub menu:on time alarm switch

The default state is ON (on-time-alarm is open from 8:00 to 20:00)

It will switch between ON and OFF(on-time-alarm is closed) when press S2. Short press S2 to save the adjusted results and quit C submenu,enterD sbumenu

D Sub menu:The first alarm-clock switch

The default state is ON (the first alarm-clock is opened)

It will switch between ON and OFF(first-alarm-clock is closed) when press S2。

If set to ON, short press S1 to save and quit,then enter E submenu;

If set to OFF, short press S1 to save and quit ,then enter G submenu;

E Sub menu:The first alarm clock set for hours

Display data will add 1 after press S2.after adjusted the E Submenu,then short press S2 to save the adjusted results and quit E submenu,enter F sbumenu

F Sub menu:The first alarm clock set for minutes

Display data will add 1 after press S2.after adjusted the F Submenu,then short press S2 to save the adjusted results and quit F submenu,enter G sbumenu

G Sub menu:The Second alarm-clock switch

The default state is ON (the second alarm-clock is opened)

It will switch between ON and OFF(second-alarm-clock is closed) when press S2。

If set to ON, short press S1 to save and quit ，then enter H submenu;

If set to OFF, short press S1 to save and quit ，then enter normal interface;

H Sub menu:The second alarm clock set for hours

Display data will add 1 after press S2.after adjusted the F Submenu,then short press S2 to save the adjusted results and quit H submenu,enter I sbumenu

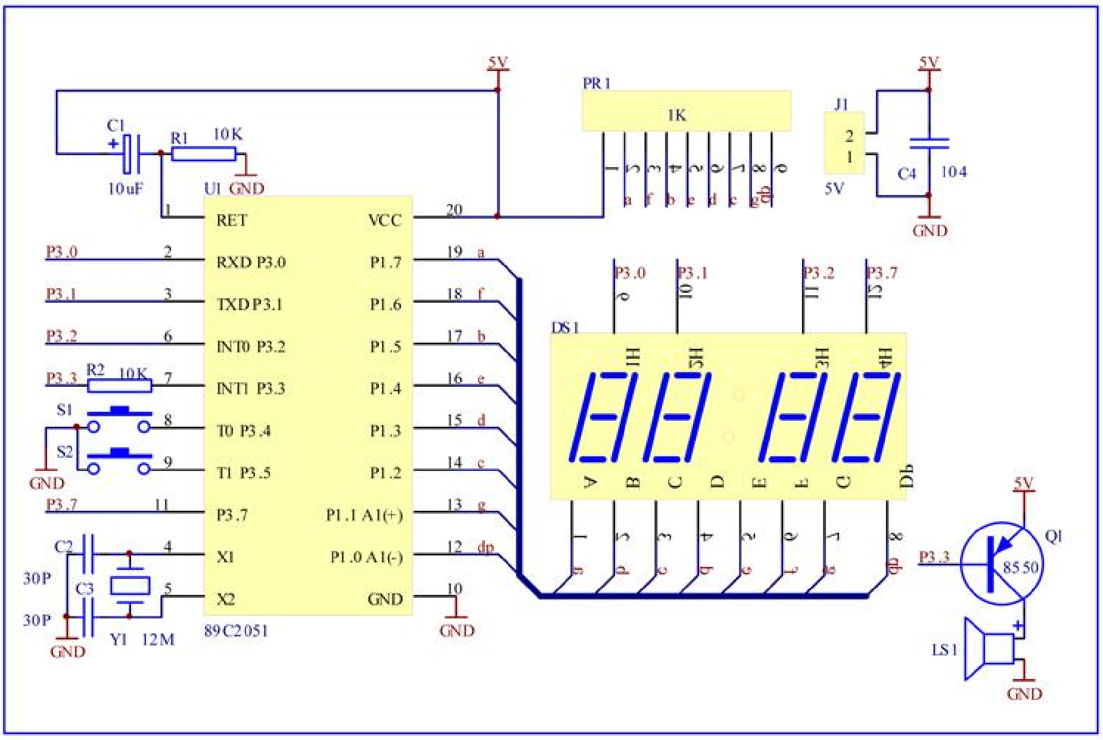
I Sub menu:The second alarm clock set for hours

Display data will add 1 after press S2.after adjusted the I Submenu,then short press S2 to save the adjusted results and quit H submenu, then enter normal interface.

Second correction:

Short press S2 in the normal interface,then enter "minutes : seconds" interface .Long press S2,make the second zero.Then short press S2 twice enter normal interface

5. Schematic



Note: there is direction for PR1 Resisters Packs , there is one side of the word in the direction of the MCU.Pay an attention!!!

6. Component listing

NO.	Component Name	PCB Marker	Parameter	QTY
1	Metal Film Resistor	R1,R2	10K	2
2	Ceramic Capacitor	C2,C3	30pf	2
3	Ceramic Capacitor	C4	0.1uf 104	1
4	Electrolytic Capacitor	C1	10uF/25V	1
5	Network Resistor	PR1	1K	1
6	Crystal Oscillator	Y1	12MHz	1
7	S8550	Q1	TO-92	1
8	Button	S1,S2	6*6*5mm	2
9	AT89C2051	U1	DIP-20	1
10	IC Socket	U1	DIP-20	1
11	Active Buzzer	LS1	5V	1
12	Digital Tube	DS1	4Bit Red	1

13	DC Socket	J1	3.5mm	1
14	Power Cable		USB to 3.5mm	1
NOTE:Users can complete the installation by PCB silk screen and component listing.				

7. Application

1>.Training welding skills
2>.Student school
3>.DIY production
4>.Project Design
5>.Electronic competition
6>.Gift giving
7>.Crafts collection
8>.Home decoration
9>.Souvenir collection
10>.Graduation design
11>.Holiday gifts

8.Installation Tips

1>.User needs to prepare the welding tool at first.

2>.Please be patient until the installation is complete.

3>.The package is DIY kit.It need finish install by user.

4>.The soldering iron can't touch the components for a long time(1.0 second), otherwise it will damage the components.

5>.Pay attention to the positive and negative of the components.

6>.Strictly prohibit short circuit.

7>.Install complex components preferentially.

8>.Make sure all components are in right direction and right place.

9>.It is strongly recommended to read the installation manual before starting installation!!!

10>.The default code inside the chip, the function is more abundant,So please do not update the code inside arbitrarily!!!

9.Installation Steps

1>.Step 1: Install 2pcs Metal Film Resistor at R1 and R2; 2pcs 30pf Ceramic Capacitor at C2 and C3;1pcs 0.01pf 104 Ceramic Capacitor at C4; 1pcs 12MHz Crystal Oscillator at Y1.

2>.Step 2: Install 1pcs 1Kohm Network Resistor at PR1.Pay attention to the installation direction.There is a smaller dot on one corner of the Network Resistor and there is a white mark on PCB where the Network Resistor can place on.These two marks are corresponding to each other and are used to specify the installation direction of the Network Resistor.

3>.Step 3: Install 1pcs DIP-20 IC Socket at U1 and pay attention to the

installation direction.There is a smaller notch on IC Socket and there is a white mark on PCB where the IC Socket can place on.These two marks are corresponding to each other and are used to specify the installation direction of the IC Socket.

4>.Step 4: Install 2pcs Black Button at S1 and S2.1pcs TO-92 S8550 Transistor at Q1 and pay attention to its installation direction.The arc of S8550 corresponds to the arc of PCB.

5>.Step 5: Install 1pcs Power Socket at J1. 1pcs 10uF 25V Electrolytic Capacitor at C1 and pay attention to its installation direction.The longer pin is positive pole for Electrolytic Capacitor.

6>.Step 6: Install 1pcs 5V Active Buzzer at LS1 and pay attention to its installation direction.The buzzer and PCB each have a mark '+' that are used to determine the installation direction.

7>.Step 7: Install 1pcs 4Bit Red Clock Digital Tube at DS1 and pay attention to its installation direction.Note that the four decimal points are below.

8>.Step 8: Install 1pcs DIP-20 AT89C2051 on IC Socket and pay attention to its installation direction.The AT89C2051 and IC Socket notches are installed in the same direction.

9>.Step 9: Connect to power supply and enjoy the effect.Set work mode and parameters as set steps.

9.Install shown steps:

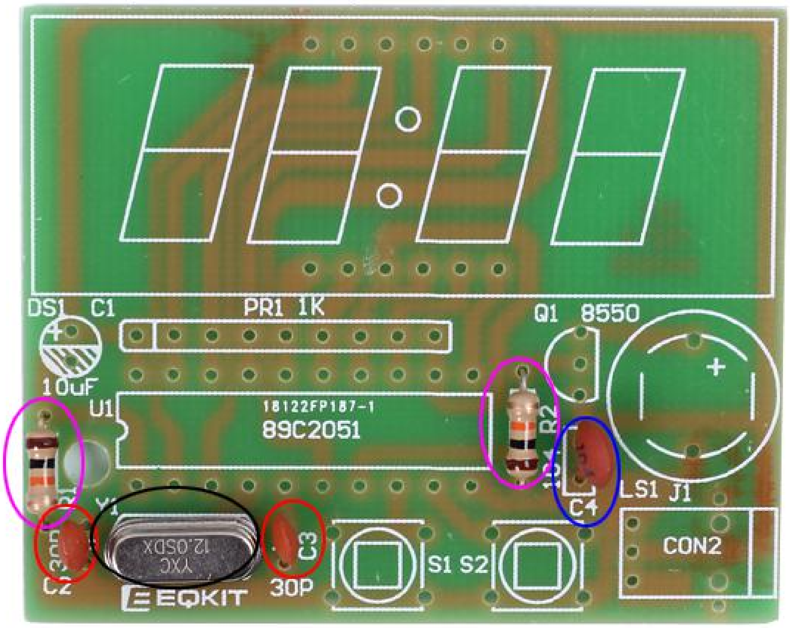
Step 1:

Install 2pcs Metal Film Resistor at R1 and R2;

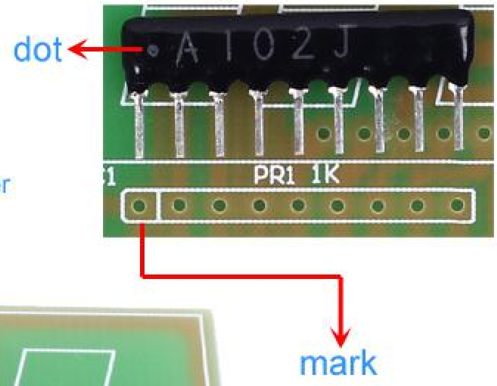
Install 2pcs 30pf Ceramic Capacitor at C2 and C3;

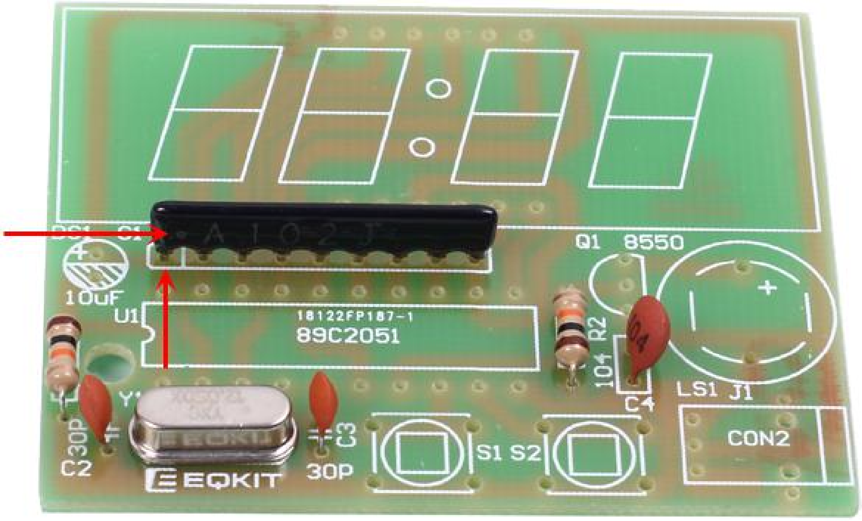
Install 1pcs 0.01pf 104 Ceramic Capacitor at C4;

Install 1pcs 12MHz Crystal Oscillator at Y1.

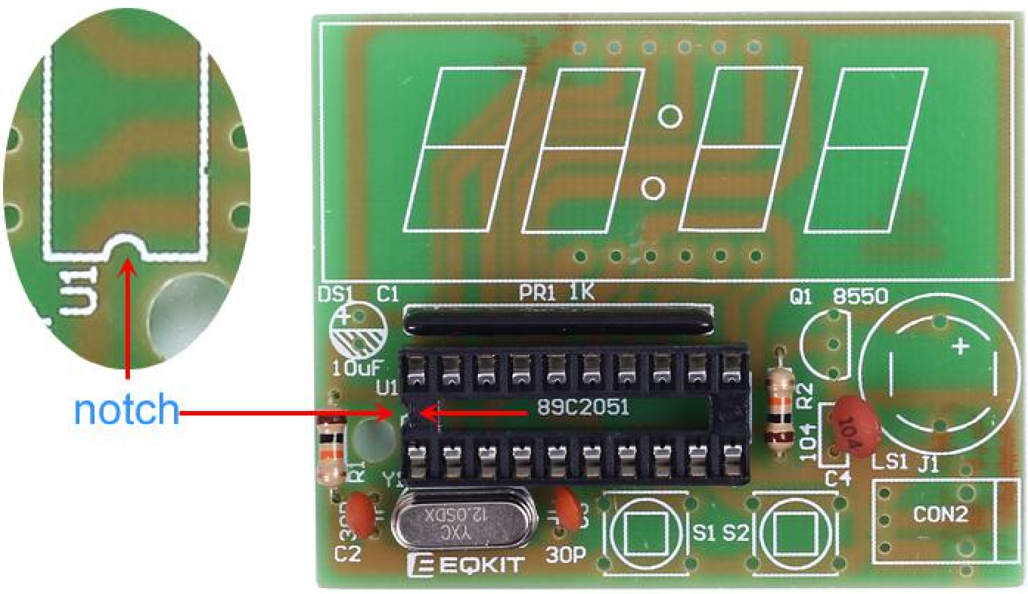


Step 2: Install 1pcs 1Kohm Network Resistor at PR1.Pay attention to the installation direction. There is a smaller dot on one corner of the Network Resistor and there is a white mark on PCB where the Network Resistor can place on. These two marks are corresponding to each other and are used to specify the installation direction of the Network Resistor.

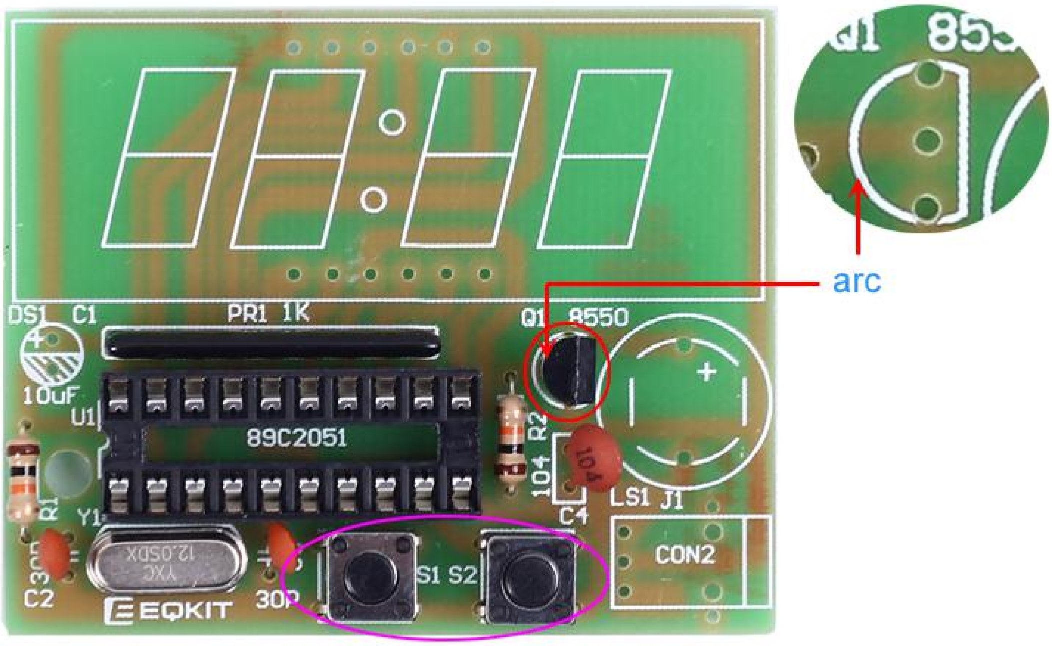




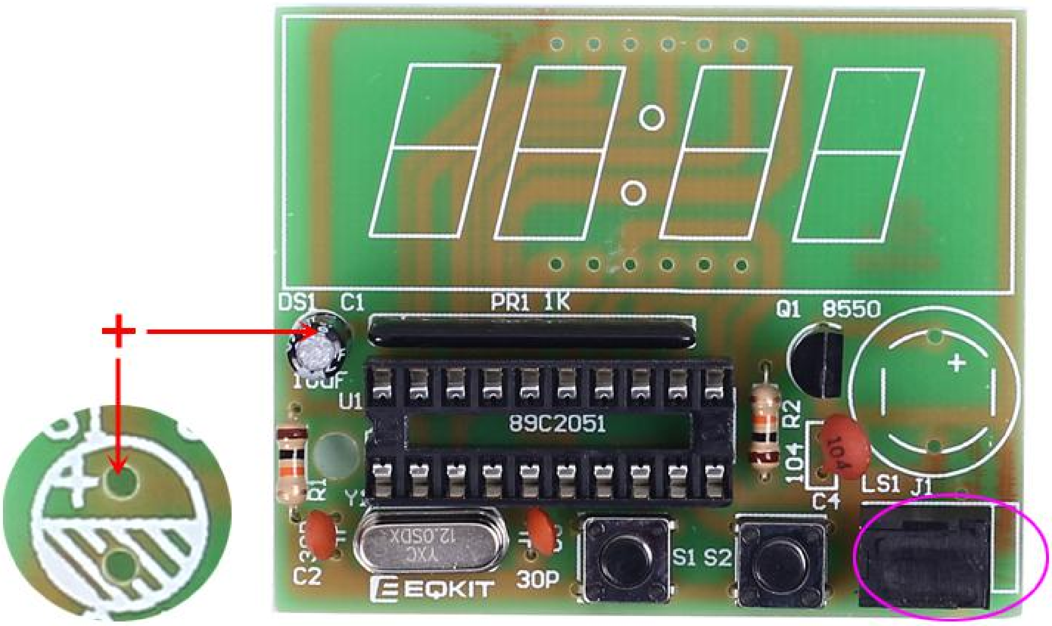
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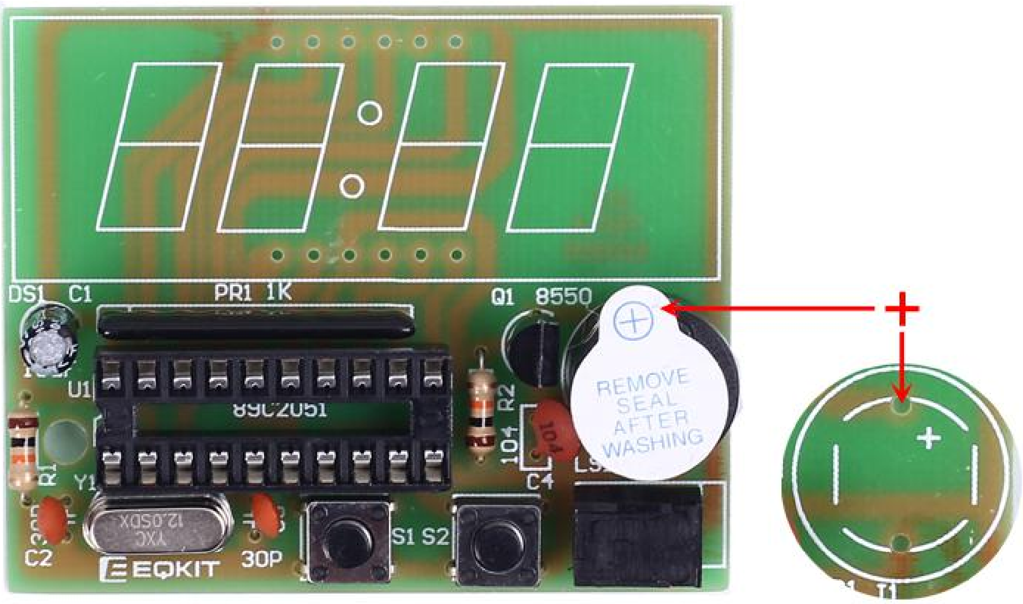
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Step 5: Install 1pcs Power Socket at J1. 1pcs 10uF 25V Electrolytic Capacitor at C1 and pay attention to its installation direction.
The longer pin is positive pole for Electrolytic Capacitor.



Step 6: Install 1pcs 5V Active Buzzer at LS1 and pay attention to its installation direction.The buzzer and PCB each have a mark '+' that are used to determine the installation direction.



Step 7: Install 1pcs 4Bit Red Clock Digital Tube at DS1 and pay attention to its installation direction.Note that the four decimal points are below.



Step 8: Install 1pcs DIP-20 AT89C2051 on IC Socket and pay attention to its installation direction.The AT89C2051 and IC Socket notches are installed in the same direction.



Step 9: Connect to power supply and enjoy the effect.
Set work mode and parameters as set steps.



10.Effect demonstration(Only for appreciation)





